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(21) International Application Number: PCT/EP94/02667 (22) International Filing Date: 10 August 1994 (10.08.94) (30) Priority Data: 9316916.7 13 August 1993 (13.08.93) GB (71) Applicant (for AU BB CA GB IE KE LK MN MW NZ SD TT only): UNILEVER PLC [GB/GB]; Unilever House, Blackfriars, London EC4P 4BQ (GB). (71) Applicant (for all designated States except AU BB CA GB IE KE LK MN MW NZ SD TT): UNILEVER N.V. [NL/NL]; Weena 455, NL-3013 AL Rotterdam (NL). (72) Inventors: GRIEVESON, Ailsa, Pauline, Hilary; 60 St. Andrews Road, Bebington, Wirral, Merseyside L63 3DJ (GB). HAGAN, Desmond, Bernard; 35 Hookstone Drive, Little Sutton, South Wirral, Merseyside L64 4TE (GB). (74) Agent: BRYANT, Tracey; Unilever plc, Patent Division, Colworth House, Sharnbrook, Bedford MK44 1LQ (GB).		(81) Designated States: AM, AT, AU, BB, BG, BR, BY, CA, CH, CN, CZ, DE, DK, ES, FI, GB, GE, HU, JP, KE, KG, KP, KR, KZ, LK, LT, LU, LV, MD, MG, MN, MW, NL, NO, NZ, PL, PT, RO, RU, SD, SE, SI, SK, TJ, TT, UA, UZ, VN, European patent (AT, BE, CH, DE, DK, ES, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG), ARIPO patent (KE, MW, SD). Published <i>With international search report. Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.</i>
(54) Title: CLEANSING COMPOSITION (57) Abstract A composition for topical application to the skin or hair, especially a cleansing composition, comprises a substituted derivative of malic, tartaric, tartronic or citric acid. The derivative incorporates either an acyl group esterifying the hydroxy group of such hydroxy acid or an alkyl group esterifying at least one of the carboxylate functions.		

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CLEANSING COMPOSITION5 FIELD OF THE INVENTION

The invention relates to compositions for application to human skin or hair, especially but not exclusively cleansing compositions. In particular, the invention is
10 concerned with mild and cleansing compositions suitable for cleansing the skin and hair.

BACKGROUND TO THE INVENTION AND PRIOR ART

15 The most widely used anionic surfactants in skin or hair cleansing compositions are alkyl sulphates, polyoxyethylene alkyl sulphates and alkyl benzene sulphonates. These compounds are known to have a good foaming and deterging power. However, due to their
20 harshness, they are not desirable as components for cleansing compositions topically applied to human skin and hair. Their damaging effect particularly where young, tender or damaged skin is involved, has been the subject of intense study for many years.

25

There is therefore a continuing need for mild surfactants, and also for products that are not only mild but also possess foaming power.

30 US-A-3,728,447 (C J Patterson) discloses hair shampoo compositions containing fatty acid lactylates or glycolates.

We have unexpectedly discovered that acyl derivatives of
35 other hydroxy acids or their salts, have unexpected mild surfactant properties.

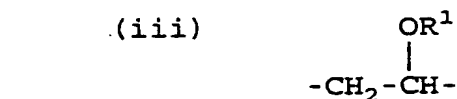
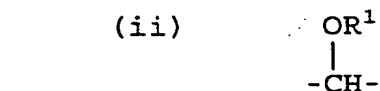
Accordingly, the invention provides a composition which comprises at least one compound which is a derivative of a

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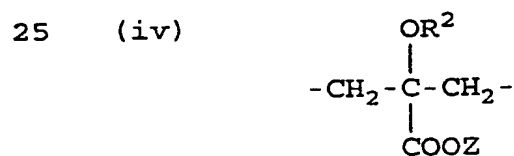
hydroxy di- or tribasic acid or salt thereof. This compound has the structure (1):



where R represents a mono- or dihydroxy moiety chosen from:



or,



and where each R^1 individually represents -H, or R^2 each R^2 individually represents



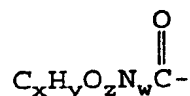
where x is an integer of from 1, preferably to 20
y is an integer of from 3 to 41
z is 0, or an integer of from 1 to 10
w is 0, or an integer of from 1 to 5, and
X, Y, and Z each individually represent -H,
 $\text{C}_x\text{H}_y\text{O}_z\text{N}_w-$ or a metallic, ammonium or

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alkanolammonium counterion;

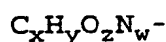
provided that at least one R^1 or R^2 group represents

5



at least one of X, Y or Z represents

10



Particularly envisaged are compounds in which at least one R^1 or R^2 is

15



and X, Y and Z each individually represent H or a counterion.

20

In compositions of this invention the compound of structure (1) generally functions as a surfactant and the composition is a foaming cleansing composition. Usually the composition includes water.

25

The invention also provides a method for the use of the composition as herein defined, for cleaning the hair or the skin.

30

The invention also provides a method for cleaning the skin or the hair which comprises the steps of

(i) applying to the skin or hair an effective amount of a cleansing composition as herein defined;

35

(ii) forming a lather on the skin or hair by massaging in the presence of added water, thereby to cleanse the skin or hair; and

(iii) subsequently rinsing the lather from the skin or

- 4 -

hair with water.

The invention also provides for the use of an effective amount of at least 0.001% by weight based on the total composition of a compound having the structure (1), as
5 herein defined, to deliver to the epidermis, as a moisturiser for the skin, the corresponding hydroxy di- or tribasic acid or salt thereof, where in structure (1), each R¹ represents -H and H, Y and Z each represent -H or
10 a counterion.

The invention also provides a method for delivering to the epidermis a hydroxy di- or tribasic acid or salt thereof having a structure as the structure (1), where each R¹
15 represents -H and X, Y and Z each represent -H or a counterion, which comprises the steps of

- (i) applying topically to the skin a composition as
- 20 (ii) leaving the composition in contact with the skin for at least 10 seconds to permit the acyl hydroxy di- or tribasic acid or salt thereof to penetrate through the stratum corneum to reach the lower strata of the epidermis; and
- 25 (iii) cleaving the acyl hydroxy di- or tribasic acid salt in the epidermis by contact with esterases to provide the hydroxy di- or tribasic acid.

30 The surfactant compound

The composition according to the invention comprises one or more derivatives of a hydroxy di- or tribasic acid or salt thereof having the structure (1), as herein defined.

35

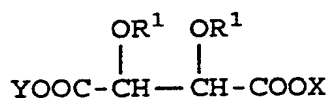
Examples of such derivatives of hydroxy dibasic and tribasic acids or salts thereof having the structure (1)

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in which R^1 or R^2 is acyl are the sodium, calcium, potassium, ammonium or triethanolammonium salts of:

(i) substituted tartaric acid having the formula

5



such as O,O'-dipropionoyl tartaric acid, also named 2,3-dioxypropionoyl tartaric acid, O-propionoyl tartaric acid, also named 2-oxypropionoyl tartaric acid, and the corresponding homologous compounds, notably

O,O'-dibutanoyl tartaric acid
O-butanoyl tartaric acid
O,O'-dioctanoyl tartaric acid
O,O-octanoyl tartaric acid
O,O'-didodecanoyl tartaric acid
O-dodecanoyl tartaric acid

20

(ii) substituted tartronic acid having the formula



25

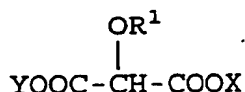
such as

O-propionoyl tartronic acid
O-butanoyl tartronic acid
O-hexanoyl tartronic acid
O-octanoyl tartronic acid
O-decanoyl tartronic acid
O-dodecanoyl tartronic acid
O-tetradecanoyl tartronic acid
O-octadecanoyl tartronic acid

35

(iii) substituted malic acid having the formula

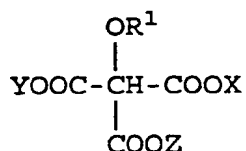
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5 such as

O-propionoyl malic acid
 O-butanoyl malic acid
 O-hexanoyl malic acid
 O-octanoyl malic acid
 10 O-decanoyl malic acid
 O-dodecanoyl malic acid
 O-tetradecanoyl malic acid
 O-octadecanoyl malic acid

15 (iv) substituted citric acid having the formula



20

such as

O-propionoyl citric acid
 O-butanoyl citric acid
 25 O-hexanoyl citric acid
 O-octanoyl citric acid
 O-decanoyl citric acid
 O-dodecanoyl citric acid
 O-tetradecanoyl citric acid
 30 O-octadecanoyl citric acid.

Examples of compounds in which X or Y is an alkyl group are

mono octyl tartrate
 35 mono decyl tartronate
 mono dodecyl maleate, and
 mono dodecyl O-acetyl citrate.

The amount of the compound of structure (1) present in the

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composition according to the invention is preferably from 0.1 to 30%, better 0.5 or 1% to 30%, most preferably from 2 to 30% by weight of the composition.

5 Co-surfactant

The composition according to the invention optionally further comprises one or more co-surfactant(s) in an amount up to 30% preferably from 5 to 25% by weight of the
10 composition. Most preferably the amount of the co-surfactant present in the composition is from 10 to 25% by weight.

The preferred co-surfactants useful in the present
15 invention are not only very mild but also result in superior, rich-foaming compositions when combined with the acyl hydroxy acids in the specified amounts.

The following compounds are suitable as co-surfactants in
20 the cleansing compositions according to the invention.

Anionic surfactant

The composition of the invention can comprise an anionic
25 surfactant which is preferably chosen from alkyl sulphate, alkyl ether sulphate, alkyl sulphonate, alkyl aryl sulphonate, olefin sulphonate, acyl sarcosinate, acyl tauride, acyl isethionate, monoalkyl sulphosuccinate, dialkylsulphosuccinate, N-acylated α -amino acid, alkyl
30 carboxylate, monoalkyl phosphate and dialkyl phosphate.

Specific examples of anionic surfactants include:

alkyl sulphates, such as sodium lauryl sulphate [e.g.
35 EMPICOL CX available from Albright & Wilson], and triethanolamide lauryl sulphate [e.g. EMPICOL TL40/T, available from Albright & Wilson].

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alkylether sulphates, such as sodium lauryl ether sulphate [e.g. EMPICOL ESB70, available from Albright & Wilson].

5 alkyl sulphonates, such as sodium alkane (C₁₃₋₁₈) sulphonate [e.g. HOSTAPUR SAS 30, available from Hoechst].

alkylaryl sulphonates, such as sodium alkyl benzene sulphonate [e.g. TEEPOL CM44, available from Shell].

10 olefin sulphonates, such as sodium olefin sulphonate (C₅₋₁₈) [e.g. HOSTAPUR OS, available from Hoechst].

acyl sarcosinates, having the structure: (51)

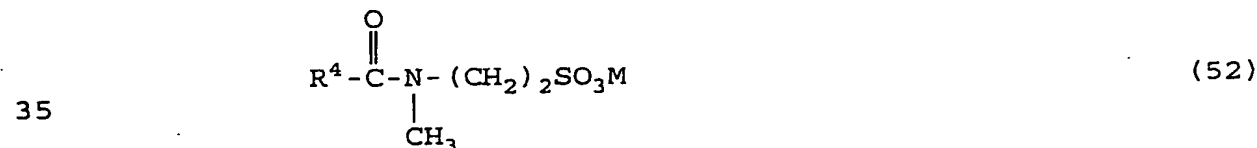


20 where R³ is chosen from C₆₋₁₄ alkyl, and

M is a counterion chosen from alkali metals, ammonium and substituted ammonium such as alkanolammonium.

25 An example of an acyl sarcosinate having the structure (51), is sodium lauryl sarcosinate [e.g. HAMPOSYL L-95, available from Grace].

30 acyl taurides, having the structure (52):



where R⁴ is chosen from C₈₋₁₈ alkyl

40 An example of an acyl tauride having the structure (52) is

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coconut methyl taurine [e.g. FENOPEN TC 42, available from GAF].

acyl isethionates, having the structure (53):

5



10 where R^5 is chosen from C_{8-18} alkyl.

An example of an acyl isethionate having the structure (53) is sodium acyl isethionate [e.g. JORDAPON C1, available from Jordon].

15

monoalkyl sulphosuccinates, having the structure (54):

20



where R^6 is chosen from C_{10-20} alkyl.

25

Examples of monoalkyl sulphosuccinates having the structure (54) include:

30

sodium lauryl sulphosuccinate [e.g. EMPICOL SLL, available from Albright & Wilson].

magnesium alkyl sulphosuccinate [e.g. ELFANOL 616 Mg, available from AKZO].

35

sodium lauryl ethoxysulphosuccinate [e.g. EMPICOL SDD, available from Albright & Wilson].

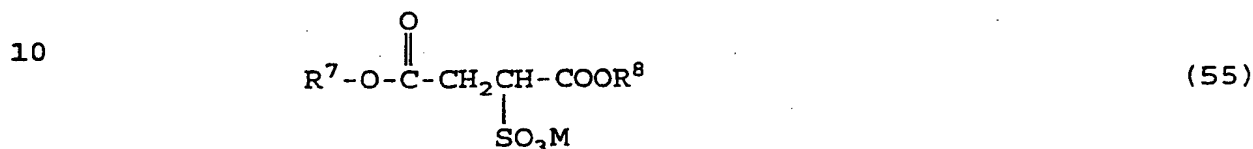
coconut monoethanolamide ethoxysulphosuccinate [e.g. EMPICOL SGG].

- 10 -

disodium lauryl polyglycolether sulphosuccinate [e.g. SURTAGENE S30, available from CHEM-Y].

5 polyethyleneglycol sulphosuccinate [e.g. REWOPOL SBFA 30, available from REWO].

dialkyl sulphosuccinates, having the structure (55):

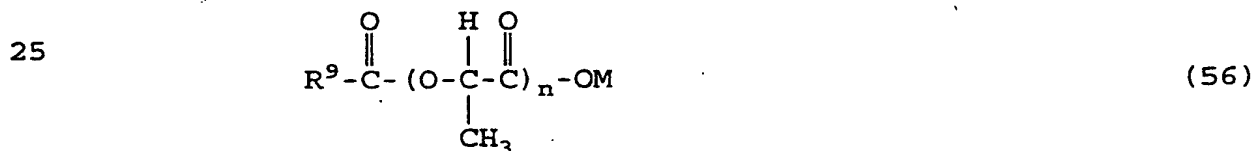


15 where R^7 and R^8 are the same or different, and are chosen from C_{6-14} alkyl.

An example of a dialkyl sulphosuccinate having the structure (55) is sodium dilauryl sulphosuccinate [e.g. EMCOL 4500, available from Witco].

20

acyl lactylates, having the structure (56):



30 where R^9 is chosen from C_{6-16} alkyl,

and n is 1 or 2.

An example of an acyl lactylate having the structure (6) is decanoyl lactylate [e.g. PATIONIC 122a, available from Patterson, CJ].

35

N-acylated α -amino acids, such as sodium lauroyl glutamate [e.g. ACYLGLUTAMATE LS-11, available from Ajinomoto Co. Inc].

40

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alkyl ether carboxylates, such as

$C_{12-14}O(EO)_4OCH_2CO_2Na$ [e.g. AKYPO RLM 38, available from Akzo].

- 5 monoalkyl phosphates and dialkyl phosphates, such as dioctyl phosphate.

Cationic surfactant

- 10 The composition of the invention can also comprise a cationic surfactant. Suitable cationic surfactants are those with the structure (57):



- 20 where R^1 , R^2 , R^3 and R^4 each represents alkyl or aryl groups,
and X represents an halogen counterion.

- 25 Preferred cationic surfactants in accordance with structure (57) include:

Hexadecyl trimethyl ammonium chloride, such as Arquad 16, available from Akzo.

- 30 Dihydrogenated tallow dimethyl ammonium chloride, such as Arquad 2HT, available from Akzo.

Dodecyl benzyl dimethyl ammonium bromide, such as Amoxyl BR 1244, available from Seppic.

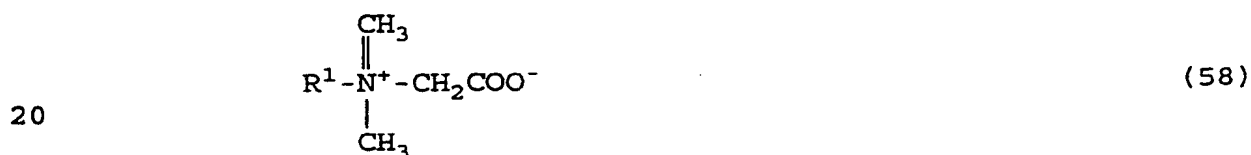
- 35 Cocoamidopropyl trimethyl ammonium chloride, such as Empigen CSC, available from Albright & Wilson.

Amphoteric surfactant

The composition of the invention can also comprise an
 5 amphoteric surfactant. Suitable amphoteric surfactants
 are derivatives of aliphatic quaternary ammonium,
 phosphonium and sulphonium compounds, wherein the
 aliphatic radicals contain from 8 to 18 carbon atoms, and
 may be straight chain or branched, and further contain an
 10 anionic water-solubilising group, such as carboxyl,
 sulphonate, sulphate, phosphate or phosphonate.

Preferred amphoteric surfactants include:

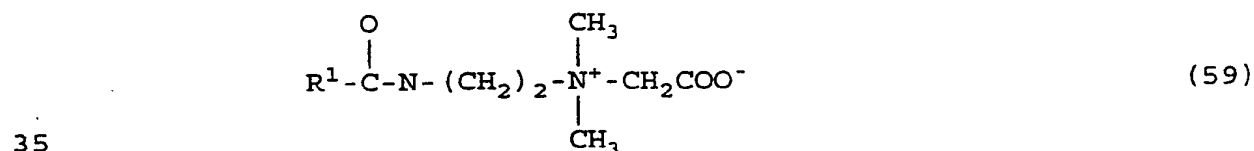
15 Alkyl betaines, having the structure (58):



where R^1 is C_{1-16} alkyl.

25 An example of an alkyl betaine having the structure (58)
 is lauryldimethyl betaine [e.g. EMPIGEN BB, available from
 Albright & Wilson].

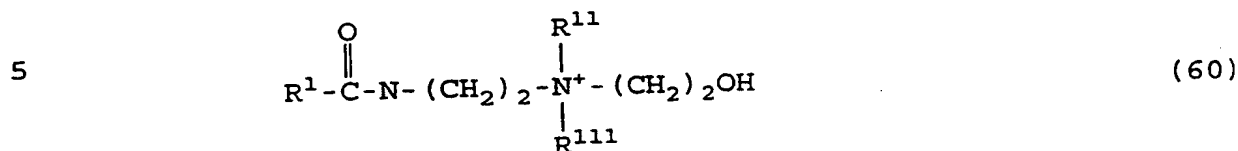
30 Alkylamidopropyl betaines, having the structure (59):



An example of an alkylamidopropyl betaine having the
 structure (59) is cocamidopropyl betaine [e.g. TEOBETAIN
 L7, available from Goldschmidt].

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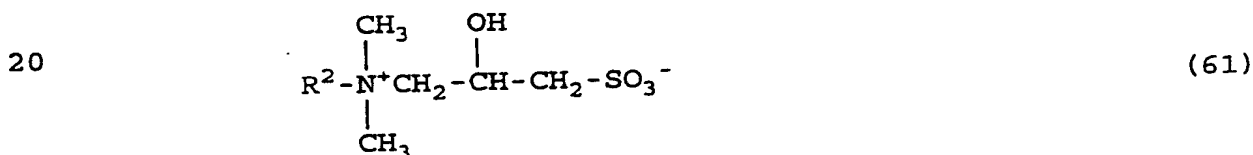
Alkylamphoglycinates or Alkylamphopropionates having the structure (60):



where R^{11} is chosen from H, CH_2COO^- and $(\text{CH}_2)_2\text{COO}^-$, and R^{111} is chosen from CH_2COO^- and $(\text{CH}_2)_2\text{COO}^-$

Suitable examples of compounds (60) are cocoamphoglycinate (available from International Specialty Products), and cocoamphopropionate.

Sultaines, having the structure (61):



where R^2 is chosen from C_{12-16} alkyl alkylamido groups.

An example of a sultaine having the structure (61) is cocamidopropylhydroxysultaine [e.g. CYCLOTERIC BET-CS, available from Alcolac).

The most preferred amphoteric surfactant are lauryl dimethyl betaine and cocamidopropyl betaine.

Nonionic surfactant

The composition of the invention can also comprise alkoxyated or glycosidic nonionic surfactant having an HLB of 8 or more. Above this value nonionics generally form clear isotropic solutions in combination with the other surfactants in the ranges defined above. Preferred

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nonionic surfactants are polyoxyethylene alkyl esters and polyoxyethylene alkyl ethers and alkyl polyglycosides.

5 A suitable example of a polyoxyethylene alkyl ester is that having the CTFA designation Polysorbate 80 which is a mixture of oleate esters of sorbitol and sorbitol anhydrides, condensed with approximately 20 moles of ethylene oxide. Also suitable is Polysorbate 20 which is
10 a mixture of laurate esters of sorbitol and sorbitol anhydrides condensed with approximately 20 moles of ethylene oxide.

Polysorbate 80 and Polysorbate 20 are available commercially as TWEEN 80 and TWEEN 20 respectively, from
15 ICI Americas.

Also suitable for use in the compositions of the invention is the polyethylene glycol ether of C_{9-11} alcohol with an average of 8 ethoxy units, which is available commercially
20 as NONIDET LE-8T or as SYNPERONIC 91-8T, and the polyethylene glycol ether of C_{12-15} alcohol with an average of 9 ethoxy units which is available commercially as DOBANOL 25-9.

25 Particularly useful alkyl polyglycosides include the glycosides of glucose or glucose oligomers where the alkyl chain can be C_{8-16} and the average number of glucose units is 1 to 2. A suitable example is ORAMIX NS 10 which is the glucoside of C_{10-12} fatty alcohol with an average of
30 about 1.5 glucose units.

Cosmetically Acceptable Vehicles

35 The acyl derivative of a hydroxy di- or tribasic acid or salt, as herein described, will in use normally be applied to human skin in the form of a composition that also comprises a cosmetically acceptable vehicle, that is

- 15 -

intended to facilitate the distribution of the hydroxy acid or salt on and over the skin surface at an appropriate concentration.

- 5 The composition can thus be solid, semi-solid or liquid in nature, dependent upon the choice of vehicle. The vehicle itself can be inert or it can possess beneficial physiological properties of its own.
- 10 The composition can also be packaged in a pressurised container for an aerosol, spray or mousse, in which case, the vehicle will usually be chosen from one or more propellants.
- 15 The selection of a vehicle for this purpose presents a wide range of possibilities depending on the required product form of the composition. Suitable vehicles can be classified as described hereinafter.
- 20 Vehicles are therefore substances that can act as diluents, dispersants, or solvents for the hydroxy alkanoate derivative which ensures that it can be applied to and distributed evenly over the skin at an appropriate concentration. The vehicle is preferably one which can
- 25 aid penetration of the acyl hydroxy acid deep into the epidermis, to enable it more readily to influence the condition of the skin.

30 Compositions according to the invention can include water as a vehicle, and/or at least one cosmetically acceptable vehicle other than water. The inclusion of at least some water, preferably as 10 to 85%, often a majority from 50 to 85% by weight of the composition is preferred.

- 35 Vehicles other than water can include liquid or solid emollients, solvents, humectants, thickeners and powders.

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The cosmetically acceptable vehicle will usually form from 10 to 99.9%, preferably 20 to 90% by weight of the composition and can, in the absence of other cosmetic materials, form the balance of the composition.

5

Optional Ingredients

10 The cleansing composition according to the invention can also comprise optional ingredients to modify the physical or chemical characteristics of the composition, e.g. product form, foaming properties, pH-value or shelf life.

Examples for ingredients which can be included in the compositions according to the invention are:

15

Emollients, such as:

- [PEG]-20 Corn Glycerides,
- [PEG]-60 Corn Glycerides,
- 20 - [PEG]-20 Almond Glycerides,
- [PEG]-60 Almond Glycerides,
- [PEG]-12 Palm Kernel Glycerides,
- [PEG]-45 Palm Kernel Glycerides,
- [PEG]-20 Evening Primrose Glycerides,
- 25 - [PEG]-60 Evening Primrose Glycerides,
- Ethoxylated (EO)-20 methyl glucoside, also referred to as Methyl gluceth-20
- Propoxylated (EO)-10 methyl glucoside.

30 A group of preferred emollients are poly (oxyalkylene) glycerides mono-substituted with a C₁₀ to C₁₈ alkyl group and having up to 20 C₂ to C₃ oxyalkylene moieties per molecule of the glyceride, as an average value.

35 Especially preferred emollients are polyoxyalkylene methyl glucosides having, as an average value, up to 20 C₂ - C₃ oxyalkylene moieties per molecule glucoside. These

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emollients are very beneficial as they impart a soft feeling to the skin and support the ability of the skin to retain moisture. Examples for such polyoxyalkylene methyl glucosides are available as Glucam E-20 and Glucam P10, respectively, from Amerchol.

Humectants, such as propan-1,3-diol, butan-1,3-diol glycerine, sorbitol, sodium 2-pyrrolidone-5-carboxylate, soluble collagen, gelatine, ethoxylated (EO)-20 methyl glucoside, and propoxylated (EO)-10 methyl glucoside.

Preservatives, such as propyl & methyl-p-amino benzoic acid, phenoxyethanol, ethanol, benzoic acid, sodium benzoate, sorbic acid, alkali metal halides;

pH controlling agents, such as sodium hydroxide, citric acid, triethanolamine, potassium hydroxide, amino sorbitol. The pH controlling agents are preferably present in an amount sufficient to adjust the composition to a pH value in the range of 5.5 to 8.5, for example using phosphate or citrate buffers.

Propellants, such as fluorochloro hydrocarbons, propane, butane, isobutane, dimethyl ether, carbon dioxide, nitrous oxide;

Foam modifying agents, such as cationic polymers, especially quaternised ammonium hydroxy ethyl cellulose polymers, e.g. available as polyquaternium-24 or polyquaternium-10. These polymers make the foam creamier and richer.

Penetration enhancers, to facilitate penetration into the skin of the surfactant compound of the structure (1).

Oil and oily materials to form the basis of emulsions.

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Emulsifiers having an HLB value of 1 to 6 to enable water-in-oil emulsions to be formed, or having HLB value of <6 to enable an oil-in-water emulsion to be formed.

- 5 Silicone oils and silicone emulsifier
- Retinoids, tocopherols and tocopheryl esters
- Preservatives
- Antioxidants
- Humectants
- 10 Buffers
- Ceramides, cholesterol, fatty acids and other skin lipids of animal or vegetable origin or synthesised chemically
- Pseudoceramides
- Vitamins
- 15 Waxes
- Plant extracts
- Thickeners

USE OF THE COMPOSITION

- 20 The cleansing composition according to the invention is primarily intended as a personal washing product for cleansing the face. It can also be used for washing the hair as well as the whole body. The composition according
- 25 to the invention is preferably used as facial cleanser, facial wash foam, hair shampoo, body shampoo, bath foam or shaving cream.

- 30 Typically, for the use of the cleansing composition according to the invention; a small quantity, for example from 1 to 5ml, of the composition is either rubbed between the hands, together with water together to form a foam which is then used for washing or applied via a sponge to the area to be cleansed, or the foam is generated directly
- 35 on that area. The foam is subsequently rinsed away with clean water.

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A composition of this invention can also serve for delivering the derivative of a hydroxy acid to skin, for is to penetrate into the skin and there undergo enzymic cleavage to yield the hydroxy acid or salt thereof, to serve as an agent to enhance skin moisture/elasticity.

A composition according to the invention can take the form of a liquid or gel, intended to be dispensed from a capped container such as a bottle, roll-on applicator or tube, or a pump-operated or propellant-driven aerosol dispenser. The composition can also take the form of a solid, such as a stick or a bar or tablet intended to be used for washing instead of a conventional soap bar.

15 Foam-Height Test

The test-method used to assess the foaming power of compounds of structure (1) for use in the cleansing compositions according to the invention is the ASTM D 1173-53 test, also referred to as Ross-Miles test, and described in J Ross and G D Miles, American Society for Testing Materials, 1953, pages 644-646. The test is carried out at a temperature of 20°C by using an aqueous test solution of 0.3% by weight of the compound of structure (1). This is a realistic concentration representing use of a cleansing composition by the consumer, e.g. when topically applied on the face or body together with water to generate the desired foam. The pH value of the test solution is adjusted to a pH of 7 by addition of aqueous sodium hydroxide solution.

Results obtained were:

	Compound	Foam Height (mm)
35	O-Decanoylcitrate	55
	O-Dedocanoylcitrate	25
	2,3-(Didodecanoxyloxy)tartrate	30

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Mono-dodecanoyl O,O'-diacetyl tartrate	65
Mono-tetradecanoyl O,O'-diacetyl tartrate	30

5 EXAMPLES

The following examples further illustrate the invention by giving conventionally prepared formulations for different types of compositions.

10

Example 1 - Facial Cleanser

		<u>wt %</u>
	O,O'-dipropionoyl tartaric acid,	
	mono potassium salt	15.00
15	Disodium lauryl sulphosuccinate	7.00
	Glycerol (Humectant)	5.00
	Sodium chloride (Thickener)	4.20
	Methyl gluceth-20 (Humectant/Emollient)	3.00
	Polyquaternium 10 (Foam modifier)	0.40
20	Ethyleneglycol monostearate (Thickener)	0.40
	Preservative	0.30
	Fragrance	0.30
	Citric acid to pH 7.0-7.5	
	Distilled water	to 100.00

25

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Example 2 - Mild Facial Cleanser

	<u>wt %</u>
O-octanoyl tartaric acid, disodium salt	20.00
Sorbitol (Humectant)	9.00
5 Sodium cocoyl isethionate	7.00
Cocoamidopropyl hydroxysulphobetaine	4.00
Polyoxyethylene [EO]-20 sorbitan monolaurate (Thickener)	3.00
10 Hydroxypropyl methylcellulose (Thickener)	0.20
Preservative	0.20
Fragrance	0.10
Citric acid to pH 6.0-6.5	
Distilled water	to 100.00

15

Example 3 - Facial Cleanser for Dry Skin

	<u>wt %</u>
O-butanoyl tartronic acid, di- (triethanolammonium) salt	25.00
20 Sodium monolauryl phosphate	10.00
Propylene glycol	10.00
Polyethyleneglycol (PEG)-150 distearate	5.00
Preservative	0.25
Fragrance	0.20
25 Citric acid to pH 6.5-7.0	
Distilled water	to 100.00

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Example 4 - Mild Facial Cleanser for Sensitive Skin

		<u>wt %</u>
	O-dodecanoyl tartronic acid, diammonium salt	20.00
5	Sodium N-methyl-N-myristoyl taurate	6.00
	Cocoamphoacetate	3.50
	Glycerol (Humectant)	9.00
	Diglycerol (Humectant)	1.00
	PEG-20 almond glycerides (Emollient)	5.00
10	Polyquaternium 24 (Thickener, Foam Modifier)	0.40
	Sodium Hydroxide (aq. soln.) to pH 6.0-6.5	
	Distilled water	to 100.00

Example 5 - Liquid Hand Soap

		<u>wt %</u>
15	O-octanoyl malic acid, dipotassium salt	7.50
	Triethanolammonium N-lauroyl glutamate	9.00
	Cocoamidopropyl betaine	4.00
	Propyleneglycol hydroxy isostearate (Thickener)	1.00
20	Trisodium citrate (Thickener)	7.00
	Preservative	0.26
	Fragrance	0.15
	Triethanolamine to pH 7.0-7.3	
	Distilled water	to 100.00

25

Example 6 - Anti-Acne Facial Cleansing Scrub Gel

		<u>wt %</u>
	O-octadecanoyl malic acid, monosodium salt	18.00
	Sodium N-cocoyl sarcosinate	6.00
30	Benzoyl peroxide (70% aq.soln.)	14.30
	Polyoxyethylene (PEG)-20 cetyl ether	
	(Thickener, Emulsifier)	10.00
	Magnesium aluminium silicate (Thickener)	1.00
	Disodium ethylenediamine tetraacetate	
35	(Chelating Agent)	0.20
	Sodium Hydroxide to pH 7.0-7.5	
	Distilled water	to 100.00

Example 7 - Hair Shampoo

		<u>wt %</u>
	O-propionoyl citric acid, monosodium salt	21.00
	Sodium lauryl (PEG)-10 acetate	4.00
5	Cocoamphodipropionate	3.00
	Propylene glycol (Humectant)	2.50
	Sodium chloride (Thickener)	1.20
	Preservative	0.20
	Fragrance	0.20
10	Citric acid to pH 6.0-6.5	
	Distilled water	to 100.00

Example 8 - Mild Hair Shampoo

		<u>wt. %</u>
15	O-octanoyl citric acid, tripotassium salt	15.00
	Lauryl ethoxylated (EO)-2.5 phosphoric acid	8.00
	Sodium pyrrolidone carboxylate (50% aq.soln.)	
	(Humectant)	1.00
	Sodium chloride (Thickener)	3.00
20	Fragrance	0.24
	Preservative	0.10
	Potassium hydroxide (aq.soln.) to pH 6.0-6.5	
	Distilled water	to 100.00

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Example 9 - Clear Conditioning Shower Gel

	<u>wt %</u>
Sodium laurylether sulphate	13.00
5 Cocoamidopropyl betaine	2.00
Glycerol	5.00
Hectorite clay	1.00
Dilauryl malate	1.50
Trisodium citrate	0.37
10 Potassium sorbate	0.37
Water	to 100

Example 10 - Facial Cream Wash

	<u>wt %</u>
15 Sodium cocoyl isethionate	7.50
Cocoamidopropyl betaine	3.75
Monoethanolamide sulphosuccinate	3.75
Glycerol	8.00
Stearic acid	3.00
20 Behenyl alcohol	3.00
Formaldehyde	0.40
Carpobol ETD 2020	0.50
Mono-isostearyl tartronate	5.00
Polyethoxypropylene glycoldioleate	0.50
25 Sodium hydroxide	to pH 5.50
Water	to 100

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Example 11 - Body Conditioning Foam Bath

		<u>wt %</u>
	Sodium cocoyl isethionate	4.50
5	Sodium laurylether sulphate	3.00
	Cocoamidopropyl betaine	2.50
	Glycerol	10.00
	Silicone DC200 10,000 cst	5.00
	Brij 30	2.02
10	Brij 35	2.92
	Distearyl tartrate	3.00
	Tocopherol Acetate	0.10
	Span 20	0.50
	Trisodium citrate	0.37
15	Potassium sorbate	0.37
	Hectorite clay	2.00
	Cationic guar gum	0.25
	Water	to 100

20 Example 12 - Water-in-oil skin cream

	<u>Ingredients</u>	<u>% w/w</u>
	Silicone oil	20.00
	Sodium chloride	2.00
25	Sodium O,O'-dipropionoyl tartrate	1.00
	Whitener	0.15
	Preservatives	0.36
	Sodium hydroxide	1.00
	Water	to 100.00

30

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Example 13 - Water-in-oil skin cream

	<u>Ingredients</u>	<u>% w/w</u>
5	Silicones	20.50
	Whitener	0.20
	Preservatives	0.30
	Perfume	0.15
	Ammonium hydroxide	7.95
10	Disodium O-octanoyl tartrate	1.00
	Humectant	10.00
	Ammonium chloride	2.00
	Water	to 100.00

15

Example 14 - Water-in-oil skin cream with sunscreens

	<u>Ingredients</u>	<u>% w/w</u>
	Silicones	24.00
20	Whitener	0.10
	Preservatives	0.01
	Dipotassium O-octanoyl malate	1.50
	Potassium chloride	1.50
	Humectants	5.00
25	Evening primrose oil	3.00
	Sunscreens	4.00
	Bactericides	0.30
	Water	to 100.00

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Example 15 - Oil-in-water skin cream

	<u>Ingredients</u>	<u>% w/w</u>
	Emulsifier	10.00
5	Silicone oil	8.00
	Thickener	0.50
	Whitener	0.10
	Preservatives	0.10
	TEA O-dodecanoyl tartronate	2.00
10	Humectant	10.00
	Evening primrose oil	2.00
	Sunscreens	3.00
	Bactericides	0.30
	Triethanolamine	3.10
15	Water	to 100.00

Example 16 - Face mask

	<u>Ingredients</u>	<u>% w/w</u>
20	Kaolin	35.00
	Bentonite	5.00
	Cetyl alcohol	2.00
	Monosodium O-propionoyl citrate	5.25
	Glycerol	10.00
25	Methyl paraben	0.10
	Potassium dodecyl sulphate	2.00
	Perfume	0.75
	Water	to 100.00

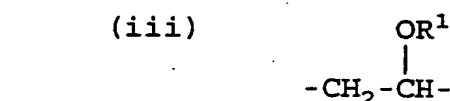
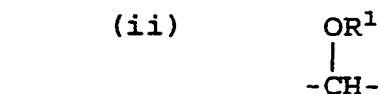
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CLAIMS

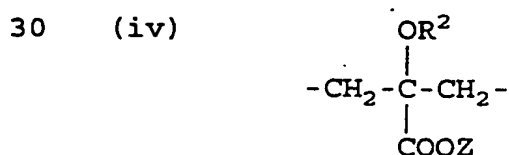
1. A composition for topical application to skin or hair
 5 which comprises at least one compound which is a substituted di- or tribasic acid or salt thereof, and which has the structure (1):



- 15 where R represents a mono- or dihydroxy moiety chosen from:



or,



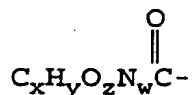
and where each R^1 individually represents -H, or R^2

R^2 represents $\text{C}_x\text{H}_y\text{O}_z\text{N}_w\text{C}-$

- 40 where
- x is an integer of from 1 to 20
 - y is an integer of from 3 to 41
 - z is 0, or an integer of from 1 to 10
 - w is 0, or an integer of from 1 to 5, and
 - X, Y, and Z each individually represent -H,

$C_xH_yO_zN_w-$ or a metallic, ammonium or alkanolammonium counterion;

provided that the compound includes at least one R^1 or R^2 group which represents



or at least one of X, Y and Z represents



2. A composition according to claim 1 wherein each X, Y and Z individually represents H or a said counterion and at least one R^1 or R^2 group represents



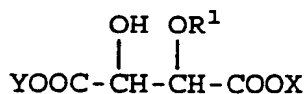
3. A composition according to claim 2, in which compound of structure (1) is in the form of the free acid or a salt chosen from the sodium, calcium, potassium, ammonium or triethanolammonium salts thereof.

4. A composition according to claim 2 or claim 3, in which compound of the said structure (1) is a substituted tartaric acid or salt thereof, with structure:



in which both groups R^1 are the same and are chosen from propionoyl, butanoyl, octanoyl and dodecanoyl, and X and Y each individually represent H or a said counterion.

5. A composition according to claim 2 or claim 3, in which compound of the said structure (1) is a substituted tartaric acid or salt thereof with structure:



5 in which R^1 is chosen from propionoyl, butanoyl, octanoyl and dodecanoyl, and X and Y each individually represent H or a said counterion.

6. A composition according to claim 2 or claim 3, in
10 which the compound of the said structure (1) is a substituted tartronic acid or salt thereof having the structure:



or a substituted malic acid or salt thereof having the structure:

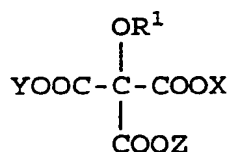


wherein R^1 is chosen from

25 propionoyl
butanoyl
hexanoyl
octanoyl
decanoyl
dodecanoyl
30 tetradecanoyl and
octadecanoyl

and X and Y each individually represent H or a said counterion.

35 7. A composition according to claim 2 or claim 3, in which compound of the said structure (1) is a substituted citric acid or salt thereof having the structure:



wherein R^1 is chosen from

- propionoyl
- butanoyl
- 10 hexanoyl
- octanoyl
- decanoyl
- dodecanoyl
- tetradecanoyl and
- 15 octadecanoyl

and X, Y and Z each individually represent H or a said counterion.

8. A composition according to any one of the preceding
20 claims containing from 1 to 30% by weight of compound of the structure (1), the composition also including water.

9. A composition according to any one of the preceding
claims which is a foaming cleansing composition.

25

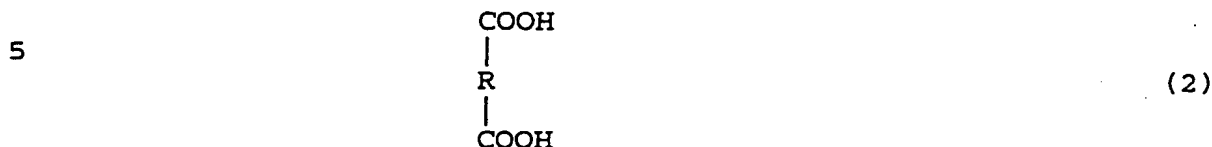
10. A method for cleaning the skin or the hair which comprises the steps of

(i) applying to the skin or hair an effective amount
30 of a cleansing composition according to any one of claims 1 to 9,

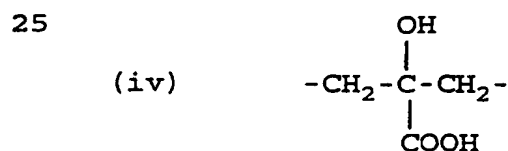
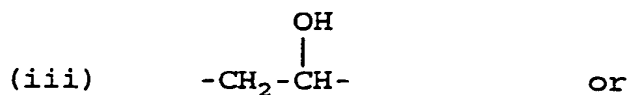
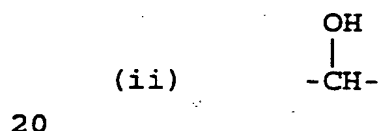
(ii) forming a lather on the skin or hair by
massaging in the presence of added water,
35 thereby to cleanse the skin or hair; and

(iii) subsequently rinsing the lather from the skin
or hair with water.

11. A method for delivering to the epidermis a hydroxy di- or tribasic acid having the structure (2):



10 wherein R represents a mono or dihydroxy moiety chosen from:



30

which comprises the steps of:

35 (i) applying topically to the skin a composition comprising, as a surfactant, the corresponding acyl hydroxy di- or tribasic acid or salt thereof having the structure (1), wherein at least R¹ represents an acyl group having the structure:



(ii) leaving the composition in contact with the skin

for at least 10 seconds to permit the acyl hydroxy di- or tribasic acid or salt thereof to penetrate through the stratum corneum to reach the lower strata of the epidermis; and

5

(iii) cleaving the acyl hydroxy di- or tribasic acid salt in the epidermis by contact with esterases to provide the hydroxy di- or tribasic acid.

- 10 12. The use of an effective amount of at least 0.001% by weight based on the total composition of at least one compound of the structure (1), as defined in claim 1, to deliver to the epidermis, as a moisturiser for the skin, the corresponding hydroxy di- or tribasic acid of
- 15 structure (2) as defined in claim 11, or a salt thereof.

INTERNATIONAL SEARCH REPORT

International Application No
PCT/EP 94/02667

A. CLASSIFICATION OF SUBJECT MATTER
IPC 6 A61K7/48 A61K7/06 A61K7/50

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 6 A61K

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP,A,0 517 371 (UNILEVER) 9 December 1992 see the whole document ---	1,7-12
X	EP,A,0 357 186 (BEECHAM GROUP) 7 March 1990 see the whole document ---	1,8-12
X	US,A,4 078 147 (UKAI ET AL.) 7 March 1978 see the whole document ---	1,8-12
X	DE,A,24 52 119 (HENKEL) 13 May 1976 see the whole document ---	1,7-12
X	PATENT ABSTRACTS OF JAPAN vol. 14, no. 220 (C-717) (4163) & JP,A,02 053 710 (KANEBO) see abstract ---	1,8-12
	-/--	

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

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- "&" document member of the same patent family

Date of the actual completion of the international search

8 December 1994

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28.12.94

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INTERNATIONAL SEARCH REPORT

Intern. Patent Application No
PCT/EP 94/02667

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	QUESTEL, File Supplier, PARIS, FR, File CAS, AN: 118-087624 * résumé * & JP-A-92202140 (IZUMOTO et al.) ---	1-3,7-12
X	QUESTEL, File Supplier, PARIS, FR, File CAS, AN: 098-056051 * résumé * & JP-A-82133198 (LION CORP.) ---	1-3,7-12
X	US,A,4 446 165 (ROBERTS) 1 May 1984 see claims 1,15 -----	1-5,7-12

INTERNATIONAL SEARCH REPORT

International Application No

PCT/EP 94/02667

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EP-A-0357186	07-03-90	AU-B- 619860 AU-A- 3674589 JP-A- 2053718 US-A- 5194250	06-02-92 04-01-90 22-02-90 16-03-93
US-A-4078147	07-03-78	NONE	
DE-A-2452119	13-05-76	NONE	
US-A-4446165	01-05-84	NONE	